

model costs for the entire state on either a CBG or wire center basis. The CPM's grid cell design is more conducive to an accurate representation of costs than the HPM's design. In addition, the CPM is more open and accessible to changes in assumptions and inputs. Also, the assumptions and inputs in the CPM are more easily verified than the HPM. For those reasons, we will adopt the CPM as the proxy model to develop the cost of providing basic service to all residential customers in California.

**F. Recommended Adjustments to the CPM**

**1. Introduction**

We have adopted Pacific's CPM in order to calculate the cost of providing basic service on a CBG level. With Pacific's original inputs and assumptions, the annual statewide subsidy amount totals \$1.7 billion, of which it is estimated that \$1.3 billion would go to Pacific initially.

Several parties recommended adjustments to the Pacific's CPM. The parties recommend that adjustments be made in order to change inputs which the parties believe lead to an overstated subsidy. For the most part, these changes affected the inputs, and not the structure, of Pacific's model. In some cases, a slight change to the model structure itself was recommended. The changes covered the number of lines to be subsidized, drop costs, cable and conduit costs, the fiber feeder cut-off, fill factors, depreciation rates, reordering of switches, the outside plant factor, switching costs, shared and common costs, and rearrangement expenses and the nonrecurring burden.

We have adopted overall adjustments which total to \$1.452 billion. This section details all of the recommended

changes. Appendix C summarizes these adjustments.<sup>38</sup> In describing the impact of the changes to the model, the effect of each change is described in isolation.

## 2. How Many Lines Should be Subsidized?

### a. Introduction

The statewide CPM, as sponsored by Pacific, includes the cost of second lines in its subsidy calculation. As testified to by several of the witnesses, the subscribership rate for second lines is approximately 17%. The issue in this section is to decide how many lines in high cost areas should be subsidized by the fund.

### b. Positions of the Parties

AT&T/MCI, and all the other members of the Coalition argue that only the primary line to a household should be subsidized.<sup>39</sup> According to the Coalition, additional access lines do not satisfy the definition of universal service under federal or state law.

Citizens agrees with AT&T/MCI witness Cornell that only the primary residential line, i.e., one line per household, should be included in the cost of universal service.

DRA takes the position that all residential lines in high cost areas should be subsidized. DRA believes that all of the lines should be subsidized because there is no rate difference

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<sup>38</sup> At the time the proposed decision was issued, Appendices C, D, and E were still undergoing verification of all the numbers and calculations. The numbers shown in Appendices C, D, and E may vary somewhat from the appendices that the Commission considers when it issues its decision.

<sup>39</sup> AT&T/MCI witness Cornell considers a household to be a situation where a person or persons live separately from others, even though they might reside in the same dwelling. Cornell's definition is virtually identical to Pacific witness Mitchell definition that a household is an unrelated, separate group or individual living separately, even if living in the same dwelling.

between the first line and any subsequent lines. Second lines also increase the utilization of the network. In addition, by subsidizing all lines in high cost areas, it encourages facilities based competition because carriers would be competing for the first line, as well as subsequent lines. DRA also agrees with Pacific's argument that primary lines are more costly when they are separated from the total cost of access lines.

DRA agrees with GTEC that if a distinction needs to be made between first and second lines, that it would place carriers in the difficult position of making judgments as to what constitutes a household, and it would create a need for exchange of information among the various carriers. Such an exchange process would be difficult, and involve the exchange of proprietary customer information.

GTEC recommends that there be subsidy support for both primary and secondary residence lines because there is no tariff distinction at present between first and subsequent residence lines. GTEC points out that supporting secondary lines would permit access to information services on the secondary line, such as an Internet provider, without interfering with the use of the primary line. If additional lines are not supported, GTEC contends that it will be necessary for prices to rise to market levels for second lines.

GTEC contends that if only one line per household is to be subsidized, then there must be a definition of a household that can be reasonably applied so that the COLR is not in a position of having to determine whether the customer constitutes a separate household or not. GTEC believes that the support of a single line will cause administrative difficulties, and that customers will construe the definition in a way that serves their own interest so that many second lines will end up being supported.

Pacific witness Mitchell testified that the subsidy should be made available for one basic service line per residence,

and that the pricing of additional lines should be based on the market. According to Mitchell, this keeps the subsidy fund reasonably scoped, and assists with the transition from regulatory pricing to economic pricing. If the Commission restricts the price of additional lines, then it must provide a vehicle to recover the full cost of those additional lines.

TURN takes the position that the fund should only provide support for the first subscription for telephone service. TURN argues that the first connection is far more essential than additional subscriptions. The first subscription enables a household to receive calls, complete local calls, and provides access to toll service. Additional subscriptions are a separate and distinct service, and generally provide the household with additional convenience.

TURN contends that limiting high cost area support to the primary line only would not create any undue administrative burden. A customer in a high cost area would merely need to certify that it only has one primary line serving that household. TURN points out that the LECs are already doing this for customers who are on the ULTS rate. The self certification process described in General Order (GO) 153 for the ULTS program could be easily modified to apply to this fund.

c. Discussion

We agree with Pacific witness Mitchell's statement in his prepared opening testimony that: "The question of how many basic service lines should be subsidized per residence is a separate issue from the accurate and complete accounting of cost." (Ex. 46, p. 11.) Mitchell testified that the incremental cost of the second line is implicit in the CPM. If the number of lines to individual premises were expanded or contracted, the model would reflect the costs of those expansions or contractions. Here, we are concerned about the number of lines that should be subsidized in each high cost area.

The Telco Act refers to universal service as an evolving level of telecommunications services. In defining the services to be funded by the federal universal service support mechanisms, one consideration is whether the telecommunications service is essential to education, public health, or public safety. (Telco Act, § 254(c)(1)(A).) The California Legislature in AB 3643 declared that universal service requires that telephone service be affordable and ubiquitously available. One of the principles of AB 3643 is that essential telecommunications services be provided at affordable prices. (Stats. 1994, Ch. 278, Sec. 1.(a), Sec. 2.(b)(1).) In determining how many lines should be subsidized in high cost areas of the state, we need to consider whether the number of lines we choose to subsidize is sufficient to provide essential telephone service.

In order to keep the fund size at a reasonable level, we believe that only the primary line, i.e., the first line, to a household should be subsidized. Subsidizing only one residential line per household in high cost areas allows that household to have essential telephone service. Subsidy of additional lines is not justified because the primary line already provides the essential connection. Subsidizing only one line per household also keeps telephone rates affordable for those who live in high cost areas, as well as for everyone who is obligated to support the fund. The arguments of DRA and GTEC that all residential lines in high cost areas should be supported would only serve to increase the size of the fund.

We will adopt an adjustment to the CPM that the staff has developed to recognize that only one line per household in a high cost area shall be subsidized. That adjustment of \$56.96 million is shown on Appendix C. This adjustment recognizes that approximately 17% of households in California have second lines. This reduces the number of subsidized lines from approximately 4.52 million lines to 3.73 million lines.

As for the possible administrative problems of having a COLR determine whether a customer has only one primary line, we believe that TURN's suggestion to use a self certification procedure has merit. As GTEC witness Mitchell acknowledged, there would only be a limited burden on the carrier if customers in high cost areas had to self certify that they only have one primary line per household. The problem that TURN addressed will become a concern as competition in high cost areas grow. That is, telephone service to a residence may be provided over the traditional copper pair owned by the incumbent LEC, or a telephone signal may come over the coaxial cable that presently serves to connect cable television. With two or more sources of connection, it is possible that a household in a high cost area may attempt to subscribe to two subsidized primary lines. That is, a customer may subscribe with the LEC to obtain the first subsidized line, and then attempt to subscribe with a CLC to obtain another subsidized line that is provided over the coaxial cable. TURN's suggestion that all subscribers requesting residential basic service in high cost areas be required to certify that they are not presently receiving residential basic service through any other telephone company will be adopted. The certification should also provide that the customer will notify the company if circumstances change. A workshop will be convened by the CSD, in conjunction with the Telecommunications Division, to discuss ways in which the self certification process in GO 153 can be adapted for use with this fund.

### 3. Drop Costs

#### a. Background

The CPM currently assumes one buried drop per residence. The drop is the connection between the subscriber network interface on a customer's premises to the company's distribution plant.

DRA believes that the cost of placing the drop is overstated. DRA recommends that the CPM's buried drop cost be reduced by half so that the cost of placing the drop is spread over two copper pairs rather than to a single pair. Pacific's standard engineering practice is to use two copper pairs in drops in buried plant to each residential subscriber.

GTEC is unclear as to the purpose of DRA's proposed modification. Although DRA proposes to support all residential lines, GTEC asserts that DRA appears to be assuming that the CPM accounts for only one drop per household. GTEC asserts that DRA's proposed modification goes against industry standards which require placement of two pairs to each residential unit.

Pacific's reply brief did not address DRA's recommended adjustment.

**b. Discussion**

GTEC's response to DRA's recommendation appears to confuse the number of drops in the CPM, with the costs of placing the drops. Our understanding of DRA's adjustment is that DRA believes that the costs of placing the drops should be shared by the two lines being buried, rather than being borne by a single line. We will adopt DRA's recommended adjustment. Adjusting the CPM to spread the cost of the drop plant over two pairs, instead of one, will result in an annual decrease to the subsidy of \$39.7 million.

**4. Cable and Conduit Costs**

**a. Background**

In the CPM, Pacific accounts for cable, conduit, pole, and pair gain costs in a table called A & B costs. "A" costs are fixed costs, and are required regardless of the size of cable or number of pairs being installed. "B" costs vary by the number of pairs being placed. The A & B costs were derived from Pacific's PLAN COSTDEC model. The PLAN model is Pacific's loop planning program.

AT&T/MCI recommends that the Commission not accept Pacific's A & B costs. AT&T/MCI witness Selwyn testified that the CPM's terrain modifying factors appear to have been developed and applied inconsistently in the PLAN COSTDEC program. The modifying factors are multiplied against the structure costs, and the costs of copper and fiber cables from the PLAN COSTDEC program. According to Pacific's CPM documentation, the modifying factors represent Pacific's estimate of how the cost of installed outside plant can be affected by topographic considerations and urban congestion. AT&T/MCI contend that the evidence strongly suggests that the PLAN COSTDEC data represents average field conditions, rather than lower cost normal field conditions. When the modifying factors are applied to average field conditions, rather than lower cost normal field conditions, the CPM is in effect double counting or overstating the effects of terrain and other sources of difficulty. Selwyn also points out that the regression analyses that were used originally to develop the A & B costs no longer exist, so the cost values that were used are unsupported.

Selwyn testified that Pacific recently announced it had developed new A & B cost values. Workpapers for the revised costs of copper cabling, and conduit sized for four or more ducts, were supplied. However, the remaining revisions to the A & B costs were not supplied and reviewed by the time hearings had concluded.

The revised copper cable cost for buried 26 gauge copper cable was reduced from \$1.60 to \$0.17 per foot. Selwyn testified that the substitution of the revised A & B costs for copper cable alone reduces the CPM's estimate of the statewide annual subsidy requirement by \$45 million.

As for the revised A & B cost for conduit, Selwyn contends that this revised cost underestimates conduit investment for distances less than 1973 feet, and overestimates conduit investment that are longer than 1973 feet. Since the average conduit length produced by the CPM is 8730 feet, if the revised



conduit A & B factors are used, the CPM will overstate the conduit costs.

DRA recommends using Pacific's revised A & B costs for copper cable. DRA estimates the annual statewide impact at about \$50.5 million.

GTEC points out that the CPM inputs rely on extensive tables of unit cost factors, such as cable and conduit costs, which have been developed outside the CPM. This is of concern to GTEC because the actual modeling of the unit costs is external to the CPM, and raises an issue about their applicability to other LECs. When GTEC witness White reviewed the cable and conduit cost inputs in the CPM, he found them to be inconsistent with his experience. GTEC believes that the CPM does not have any internal controls which assure that the assumptions used in developing these different unit cost inputs are consistent with each other, with the size of the wire center being evaluated, or with a specific network design for that wire center. GTEC also asserts that in addition to the unit costs, other key assumptions used in the model, such as the ratio of feeder to distribution, and the mix of cable by density zone, are based on averages or practices specific to Pacific.

GTEC proposes that a simple, consistent, and observable process be used to develop the unit cost estimates used in the CPM. GTEC has developed a spreadsheet which accepts some of the basic cost elements such as cable material costs and placement costs. These cost elements are based on GTEC's recent contract with Lucent Technologies (Lucent). This process also accepts assumptions for the rules that govern how these basic elements are combined, such as cable sizing, the branching and spacing of cable routes, and utilization rates. By modeling the wire center network using this information, this process would create a consistent set of unit cost values which would be used to populate the unit cost tables in the CPM.

Pacific agrees that the Commission should use the A & B costs for copper cable.

**b. Discussion**

We address three issues in this section. The first is the A & B copper cable cost. The other two issues relate to the conduit and cable costs generated by the CPM.

The CPM, as sponsored by Pacific, contains cable sizes based on averages from Pacific's installed plant. Separate samples of feeder and distribution plant were taken to identify what sizes of cable typically serve distinct categories of density. Feeder plant was sized based on the COSTDEC database, while distribution plant was sized based on OANAD loop samples.

GTEC's proposed method would base cable sizes based on its external modeling process. GTEC's method sizes feeder plant according to the number of access lines served by a central office. Distribution plant would be sized in accordance with the number of lines in the distribution area.

The modification to the A & B copper cable cost is supported by Pacific's revised cost of copper cable to \$0.17. Since this revised cost was not included in the CPM runs that Pacific sponsored during the hearings, this change needs to be reflected in the CPM. We will adopt the revised copper cable cost. This adjustment to the CPM results in a \$46.06 million annual adjustment.

The modification to the conduit costs is less clear. The source for Pacific's A & B conduit costs is the PLAN COSTDEC program. AT&T/MCI witness Selwyn points out that the regression that Pacific used to develop the conduit costs in the CPM was in error because it simplified the regression by failing to include a function that reflects cost incurred on a per trench foot basis. We believe that this manipulation of the regression tends to inflate conduit costs. Therefore, we will adopt GTEC's estimate of the A & B conduit costs, which are based upon proprietary vendor

prices. Adoption of GTEC's estimate for the cost of conduit results in an annual adjustment of \$95.2 million.

We will also adopt GTEC's proposed feeder and distribution cable sizes with some modification. When the Telecommunications Division staff analyzed GTEC's proposed cable sizes for distribution plant in the more dense areas, it was determined that some of the cable sizes were unrealistically large. Adoption of GTEC's estimate of cable sizes, as modified, results in a \$46.06 million adjustment.

5. Fiber Feeder Cut-off

a. Background

The material used for feeder plant depends on the length of the feeder route. The CPM assumes that if the feeder length is longer than 9000 feet, fiber is used. If the feeder length is shorter than 9000 feet, copper is used. Pair gain technology is used in conjunction with fiber feeder at the serving area interface. It is the cost of the pair gain device itself, rather than the type of cable, which drives the economics of feeder technology.

AT&T/MCI contend that the 9000 feet cut-off point is not a reasonable assumption. They point out that the CPM should take all significant factors, such as capacity requirements, into account that impact the choice of copper cable versus fiber. The CPM's assumption of 9000 feet generates loop investment costs that do not consider whether or not that distance is the economically efficient cut-off point for primary residential service. AT&T/MCI argue that that in the last seven years, Pacific has made a number of revisions to its guidelines governing the planning and provisioning of feeder facilities to support advanced digital and broadband services. According to AT&T/MCI, this has led to a significant overbuilding of feeder facilities in relation to those facilities that are actually required to meet the demand for residential access lines and other plain old telephone service

(POTS) services.<sup>40</sup> This is evidenced by excessively low feeder plant utilization factors. AT&T/MCI also point out that Pacific's Crossover Study fails to provide any support for the use of a 9000 feet cut-off.

DRA recommends that the fiber feeder length assumption in the CPM be changed to reflect that fiber only be considered for feeder plant which exceeds 12,000 feet. When DRA investigated this issue, it was determined that Pacific's documents in support of the 9000 feet cut-off was for loop broadband planning. DRA asserts that the cost of basic service should not be used to subsidize the development of broadband services. GTEC uses fiber when the feeder length is beyond 12,000 feet. The BCM also considers the use of fiber when the total feeder length exceeds 12,000 feet.

GTEC recommends that the CPM be modified to assume that pair gain devices be placed no farther than 12,000 total feet from the end user. GTEC states that the 12,000 feet cut-off point is consistent with its engineering practices.

Pacific argues that the drop in electronics prices make it economical to place fiber for all feeder routes which exceed 9000 feet. According to Pacific, the 9000 feet cut-off makes economic sense for even narrow band telephony. Pacific also points out that GTEC's recommendation is based on 12,000 feet of the total loop length, whereas DRA's recommendation is 12,000 feet of feeder length. Pacific's copper distribution runs tend to be 2800 to 3200 feet in length. If GTEC's distribution runs are the same, GTEC's feeder length would be about 9000 feet. Pacific also contends that if the cut-off is increased to 12,000 feet, an

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<sup>40</sup> POTS is a frequently used industry acronym which refers to an analog voice grade dial tone access line.

increase in costs will be needed to reflect the costs of maintaining more copper in the feeder.

**b. Discussion**

The testimony of AT&T/MCI witness Selwyn is compelling. He points out that Pacific's feeder plant planning practices have been in transition from the provisioning of POTS, to the provisioning of advanced narrowband and broadband digital services. His testimony traces the reasons why Pacific's fiber feeder cut-off point have been reduced from 12,000 feet to 9000 feet. The 9000 feet cut-off would not make sense in low density, rural zones, where demand and capacity requirements are smaller. Additionally, a cut-off of 9000 feet would shift the costs associated with higher bandwidth services onto the costs of providing basic service. As a result, we believe that the CPM's estimate of loop investment costs are overstated, and does not accurately represent the least cost, forward looking, method of providing residential basic service.

The CPM's maintenance expenses reflect Pacific's 1994 experience at a time when the company's plant was almost exclusively copper with far less fiber than even the 12,000 feet cut-off implies. If the 9000 feet cut-off is more appropriate, then the model ought to reflect significant savings in maintenance expense over the 1994 figures used. By changing the parameters in the model, we are not indicating a preference for any particular technology choice. We are simply creating a standard based on what appears to be the least cost technology at the present time.

Accordingly, we adopt the recommendation to extend the cut-off of copper feeder versus fiber feeder from 9000 feet to 12,000 feet. Adopting this modification results in an annual subsidy decrease of \$77.6 million.

## 6. Fill factors

### a. Background

The fill factor is a measure of how much of the plant is being used to provide service to customers. The fill factor is also known as the utilization rate. The fill factors are used to determine the size of feeder cables and related facilities. They are also used in the CPM to spread the cost of the resulting feeder investments, together with the costs of conduit and other support structures, over the working feeder lines.

Parties debate what level the fill factors should be for feeder, distribution and pair gain in the model. Pacific has set the fill levels for copper feeder, for fiber feeder, for pair gain, and for copper distribution. These fill levels are called the actual fills.

There is another level for fill known as administrative or design fill. The administrative fill factors are the ones that are currently being used by Pacific in the OANAD proceeding.

AT&T/MCI argue that Pacific has reported unreasonably low actual fill factors. They state that the low utilization levels are directly attributable to Pacific's announced plans to build a network capable of providing far more services than basic local exchange service. AT&T/MCI do not believe that this excess capacity should be borne by basic local exchange service. To correct this deficiency, AT&T/MCI witness Selwyn suggests changing the copper feeder fill factor to 89% and the copper distribution factor to 71% for all density zones. Such an adjustment results in an annual decrease of \$87.2 million. He also suggests raising the pair gain fill factor for density zones 4-7 to 73%, 73%, 82% and 83% respectively. This adjustment decreases the annual requirement by \$29.8 million.

CCTA points out that the utilization factors that Pacific uses in this proceeding differ substantially from Pacific's

fill factors in OANAD. According to CCTA, this results in a higher allocation of spare capacity costs to the universal support level than to the OANAD price floors. As a result, the TSLRIC for universal service is higher than the OANAD TSLRIC. CCTA asserts that the actual fill factors should have been used for OANAD instead of in this proceeding. CCTA recommends that due to the interrelationship between OANAD and universal service with respect to the fill factors, the Commission should ensure that the TSLRIC adopted for universal service is no higher than the TSLRIC adopted in OANAD.

DRA recommends that the Commission adopt the administrative fill factors because those are the factors that Pacific is using in OANAD. DRA also states that the lower utilization factors used in the CPM represent the less efficiently designed networks of the local exchange carriers.

GTEC disagrees with DRA and argues that higher fill factors are unrealistic. GTEC states that the design utilization factors used in OANAD were set at an upper bound to establish the theoretical minimum cost of service. The objective in this proceeding is to establish an equitable price for basic service. GTEC asserts that the design utilization rate is not the objective level network designers seek to achieve over time, but rather, is the trigger point for placing additional facilities.

Pacific contends that average fill factors are appropriate for determining universal service funding. Pacific's existing utilization is based upon all of Pacific's engineering decisions which determine the most efficient manner of providing narrowband telephone services. Pacific argues that if design utilization factors are used, such modeling will fail to account for the LEC franchise obligation to have plant ready to serve upon demand. This will result in held orders and service delays.

Pacific argues that the high fill factors recommended by Selwyn could never reach these levels because they do not

account for defective pairs, maintenance replacement for defective pairs, or for the idle assigned pairs that are required for quick dialtone.

**b. Discussion**

We have stated previously that we intend to have the proxy cost model be reasonably consistent to the practices adopted in the OANAD proceeding. As such, we will adopt DRA's recommendation to use the design fill factors for feeder and pair gain.

On the distribution side, we will adopt Pacific's distribution fill factors. We consider this an extremely generous assumption. Given that these distribution fill factors include second lines, we are allowing triple the capacity that would be employed serving only one line per household.

This adjustment results in an annual decrease to the subsidy amount of \$90.7 million.

**7. Depreciation**

**a. Background**

The CPM includes a calculation for depreciation of network plant. Pacific used shorter lives in the CPM, which resulted in higher depreciation rates. The "economic lives" used by Pacific in the CPM are shorter than the depreciation lives approved by the Commission.

AT&T/MCI witness Selwyn contends that the depreciation levels proposed by Pacific overstate the universal service funding requirement by \$216 million. This is because the rates are based upon Pacific's network modernization strategy and preferred depreciation lives. Selwyn states that the Commission should use, at a minimum, the depreciation rates and lives which the Commission has approved for Pacific. Selwyn points out that a network that is designed to support a primary residential access line to each household will be subject to less technological and market obsolescence than a network designed to accommodate a



variety of discretionary and potentially competitive services. AT&T/MCI also argue that there are Commission procedures for setting and changing depreciation lives and rates, and that Pacific has not formally asked to have their depreciation lives reduced.

DRA agrees with AT&T/MCI that the CPM should reflect Commission approved depreciation lives and depreciation rates. DRA states that the Commission has always prescribed depreciation lives for the intrastate jurisdiction only after staff review, public comment, and a public hearing process. DRA estimates that this adjustment will result in a decrease of \$245 million per year.

GTEC contends that since the purpose of the proxy cost model is to estimate forward-looking costs, the depreciation costs must also be forward-looking. GTEC supports the use of economic depreciation as the only forward looking depreciation estimate because it is the best estimate of how long the plant will be economically viable. GTEC argues that the composite book depreciation used in the HPM and BCM, as well as the prescribed Commission lives, reflect a regulatory process that historically kept depreciation low and extended capital recovery beyond the economic lives of the equipment.

Pacific argues that these new economic lives are appropriate for determining depreciation in the CPM because they better reflect the competitive realities which the LECs are facing. Pacific witness Emmerson stated that the use of prescribed lives in the past led to depreciation reserve deficiencies, a practice which is unlikely to be sustainable in a competitive environment. Pacific argues against using the longer lives in the CPUC approved depreciation rates. In Richard Scholl's testimony for Pacific, he states that "Because the implicit investment recovery guarantee from regulators for the franchise monopoly, no longer exists, the regulatory revenue requirement/rate of return framework which allowed excessively long depreciation lives for LECs is no longer

valid." (Ex. 86, p. 13) Scholl claims that using CPUC approved depreciation lives will understate the costs of universal service.

**b. Discussion**

It is important to keep in mind that the purpose of this proceeding is to model the cost of providing universal service. It is not designed to model the cost of a state of the art network for every conceivable telecommunications service.

We agree with Pacific witness Scholl's statement that "Any proxy cost model intended to sustain universal service in the face of competitive entry must reflect economic lives consistent with fully competitive markets." (Ex. 85, p. 15.) However, we also agree with AT&T/MCI witness Selwyn's characterization that a network for providing universal service should be subject to less obsolescence than a network designed to accommodate a variety of discretionary and potentially competitive services. (Ex. 7, pp. 87-88.) As Selwyn points out, "If the 'economic depreciation rates' reflect replacements that were driven, even in part, by the desire to obtain these additional revenue sources, then it is clear that these depreciation costs are not caused by POTS and there is no basis for including them in any subsidy scheme." (Ex. 10, pp. 11-12.)

One would expect a more rapid turnover of the facilities used to provide advanced telecommunications services. However, the facilities used to provide basic service throughout the state are less likely to be replaced as quickly. As Selwyn points out, one of the reasons why Pacific replaces analog central office switches with digital switches is to support various discretionary services that can generate additional revenues. (Ex. 10, p. 11.) Pacific witness Scholl concedes that new switches provide advantages, such as advanced capability, over existing technology. (Ex. 85, p. 16.)

Public Advocates witness Thomas Hargadon stated: "It would be useful to obtain analyses of what the 'actual' number of

years, switches and especially local loops are being replaced in high-cost areas." (Ex. 21, p. 7.) None of that information has been supplied. Without that information, we do not believe that the economic life depreciation method should be used because Pacific has not demonstrated that the accelerated replacement of plant is necessary for the ongoing provisioning of residential basic service. Instead, we believe that the Commission approved depreciation lives that were established in D.95-11-009 should be used in the CPM.

The adoption of the Commission approved depreciation lives results in a \$245 million annual decrease in the subsidy amount.

## **8. Reordering of Switches**

### **a. Background**

Prior to INDETEC's modification of the CPM at the request of GTEC witness Roger White, the CPM classified wire centers into seven zones on the basis of the average population density of the grid squares associated with each wire center. Those density zones determine the cost of the central office switch, as well as the cost of the feeder.

GTEC asserts that the CPM's approach to calculating the switch and the feeder costs is unsatisfactory because the CPM does not consider the line counts in the office to determine those costs. GTEC contends that the size of the switch and the feeder routes are dependent on the number of lines the switch serves. GTEC also contends that designating wire centers by density zones does not adequately capture differences in office size. As a result, the CPM produces inconsistent results. For example, 16,000 line switches are placed in the highest density zone, while larger 40,000 line switches are placed in the middle density zones. In addition, the switching costs in the CPM do not reflect economies of scale and scope.

GTEC recommends that the wire centers in the CPM should be assigned to zones based on the number of business and residence lines in each wire center.<sup>41</sup> According to GTEC, this modification allows the model to calculate the feeder size and the conduit cost of each central office consistent with the size of each office.

**b. Discussion**

No one commented on GTEC's switch reordering proposal. Although GTEC witness White agreed with Pacific that the CPM's method of sizing feeder and switch size by density zone was not necessarily an error, Pacific did not rebut the mismatches that White had observed. We will adopt GTEC's proposal so that the CPM can avoid the mismatches that GTEC observed, as well as to take into account the economies of scale for switch and feeder plant. The adoption of this proposal results in an annual subsidy decrease of \$107.5 million.

**9. Outside Plant Factor**

**a. Background**

The CPM makes an adjustment to the costs of outside plant based on which density zone the outside plant is placed. If the plant is placed in highly dense urban areas, the outside plant factor is set greater than one to account for the difficulty in placing plant in urban areas.

GTEC states that the CPM's adjustment factor for outside plant is not supported by price quotes, and that the CPM has already included an adjustment for such factors. For example, the CPM uses an adjustment factor for urban areas making it more

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<sup>41</sup> GTEC witness Roger White worked with INDETEC to make this modification to the CPM. However, the CPM model that the other parties had analyzed during the hearing did not incorporate this modification.

expensive than average to place outside plant in the most dense zones. However, this adjustment is on top of an adjustment of input prices. GTEC recommends that the Commission should revise the outside plant factor to 1 for dense areas.

Pacific states that this adjustment reflects the fact that cities often restrict the times when their streets can be dug up. Pacific claims that it is more expensive to install outside plant in downtown San Francisco than it is in less dense areas because of scheduling limitations, traffic and difficulty in locating or spotting materials prior to installation.

**b. Discussion**

We adopt GTEC's adjustment to the outside plant factor. GTEC's actual practices show that no cost difference exists. The model should not artificially create a difference. In addition, as we discussed in reference to cable and conduit costs, the historically based cost estimates of facilities placement Pacific relies on represent an average cost. There is no reason to increase these costs for the relatively densely populated areas where most customers live, and where most facilities to serve them are placed. If an adjustment were necessary, it should only be in atypical areas, for example, extremely dense areas. Average costs should not be augmented to meet typical conditions.

Pacific's anecdote about the additional cost of restrictions placed on construction appears to refer to central business districts and commercial centers. This type of adder may be more appropriate for business lines than residential lines. The residential neighborhoods of California's most dense cities have less inhabitants during the daytime hours, and construction is more likely to be encouraged during those hours than discouraged.

Adoption of this modification results in a \$33.8 million annual decrease.

## 10. Switching Costs

### a. Background

AT&T/MCI witness Selwyn discussed switching costs in his opening testimony. Selwyn states that Pacific's switching costs are greatly overstated because the CPM uses the figure \$239.13 to represent total switch costs per line. Selwyn asserts that these costs are not appropriate and consistent with expenses incurred on a forward looking basis. Selwyn goes on to say that Pacific announced in a January 1993 press release that it would spend just over \$1 billion to replace all of its remaining analog switches with digital ones. These switches would serve 9.1 million lines. Selwyn's calculation based on the press release amount is that the switching cost per line is \$110, or \$130 less per line than assumed in the CPM calculation. This switching adjustment to the CPM would reduce the annual subsidy amount by \$289 million.

DRA had originally recommended in its opening testimony that the switching costs used in the CPM be lowered. DRA examined the vendor prices for DMS-100 and 5-ESS switches, as well as the SCIS model's calculation of the inputs. DRA found that Pacific did not utilize the maximum possible discounts available for both switches. Instead, Pacific used a weighted average of switch discounts. DRA recommended that the switch costs should reflect the higher discount available from manufacturers. In DRA's reply testimony, DRA changed its position on switching costs. After further analysis and investigation, DRA no longer recommends that there be an adjustment to the switching costs.

Pacific argues that there are life cycle price variations for switching equipment. Pacific witness Scholl states that Pacific does not always get the maximum discount for its switches because it sometimes purchases switches before the models become the standard in the market. Depending on the stage at which the switch is purchased, maximum discounts may not be available.

b. Discussion

AT&T/MCI witness Selwyn's calculation of the switching costs has some merit in that it is based on an announced expenditure by Pacific. However, aside from the press release, there is no supporting evidence that the \$110 switching cost per line is accurate. Instead, Selwyn suggests that the CPM should assume that maximum price discounts will exist over the technology life cycle for digital switches. According to DRA witness Hassan Mirza, given Pacific's size, one would expect that Pacific has the ability to get the highest discount. But given the price cycle analysis of Pacific, Pacific may not be able to experience a constant level of high discounts over the long run.

We will use Pacific's estimate of the switch costs. This estimate is consistent with the depreciation adjustment that we have adopted. As Pacific witness Scholl testified, the prices for new switches are not discounted significantly until the new technology becomes the standard, and a large number of older technology switches are replaced. The new technology provides advantages over existing technology. (Ex. 85, pp. 16-17.) If the CPM reflects this long run view of switching costs, then it can be assumed that the switches that provide universal service will not have to be replaced as frequently because the capabilities for basic service already exist in today's generation of switches. If shorter economic depreciation lives are used, then one would expect a more rapid replacement of older switches with commensurate higher discounts. Pacific has provided switch costs based on the life of the switch rather than the price it is currently paying for new switches, and therefore, longer switch lives are appropriate. Pacific's view of switch prices is incompatible with the short economic lives that Pacific has proposed.

## 11. Shared and Common Costs

### a. Background

Shared and common costs have been defined in the CCPs of the OANAD proceeding as follows:<sup>42</sup>

"Shared costs -- Costs that are attributable to a group of outputs but not specific to any one within the group, which are avoidable only if all outputs within the group are not provided."

\* \* \*

"Common costs -- Costs that are common to all outputs offered by the firm. While these costs are not considered part of a TSLRIC study, recovery of such costs is required. Recovery of common costs is a pricing issue." (D.95-12-016, App. C, pp. 5-6.)

The CPM accounts for shared and common costs, which Pacific states are attributable to universal service. Pacific initially estimated the shared and common costs at \$5.00 per line. It subsequently increased that estimate to \$6.70 per line. The allocation of these costs was a subject of much dispute in the hearings. Another issue that is related to this discussion is whether or not the loop itself is a shared cost of a family of services.

AT&T/MCI argue that the universal service fund should not recover any greater portion of the shared and common facilities used to provide universal service than the shared cost of the loop. AT&T/MCI witness Cornell stated that the loop is a shared cost of all the services that use the loop. Cornell also asserts that

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<sup>42</sup> The definition of shared and common costs used in the CCPs were taken from a cost study report submitted to the Oregon Public Utility Commission.



beyond the full cost of the loop itself, all other shared and common costs should be recovered through other services.

Cornell states that if the Commission does not exclude these other shared and common costs it would subvert the purpose of the fund and discourage the development of competition because the other carriers would end up paying the shared and common costs of the incumbent LECs. As a result, the incumbent LECs would have a competitive advantage, and they could use those revenues to unfairly compete against new entrants.

AT&T/MCI also argue that if shared and common costs are to be included, then the associated revenue sources must be considered as well. They point out that Pacific seeks to exclude all revenues except for basic residential service rates. They also argue that the CPM's allocation is unreasonable and arbitrary because the CPM shifts a substantial portion of the costs that are actually service-specific to other services, to basic service.

AT&T/MCI witness Selwyn recommends that the Commission adopt either one of the following two proposals:

(1) given that the allocations of shared and common costs among family members are invariably arbitrary, shared and common costs, and the associated family revenues should be left out of the equation; or (2) if shared and common costs are included, then all of the revenue sources that contribute to the shared and common costs to the extent of their assignment to a particular service, must be included.

CCTA argues that inclusion of some shared and common costs in the calculation of the universal service fund is appropriate. CCTA's witness, Dr. Marvin Kahn, argued that:

(1) some of Pacific's shared and common costs are actually direct costs associated with providing basic residential service; and  
(2) that the remaining shared and common costs should be distributed on the basis of the margins on incremental costs